

## CLAIMS

What is Claimed is:

1. A peripheral device having bus isolation and comprising:  
a signal translator receiving a plurality of input/output (I/O) signals  
5 from a peripheral device logic and for translating between said plurality  
of I/O signals and a plurality of bus signals which are fewer in number  
than said plurality of I/O signals;

a first unidirectional to bi-directional converter coupled to said  
signal translator;

10 an optical isolation barrier coupled to said first unidirectional to bi-  
directional converter via first unidirectional signal lines;

a second unidirectional to bi-directional converter coupled to said  
optical isolation barrier via second unidirectional signal lines that are  
electronically isolated from said first unidirectional lines, said second  
15 converter for generating a plurality of isolated bus signals; and

an interface for interfacing with a serial bus using said plurality of  
isolated bus signals.

2. The peripheral device of Claim 1 wherein said translator  
20 circuit is a microcontroller which signals bus communication direction by  
a dedicated bus direction signal pin that is coupled to both of said first  
and second unidirectional to bi-directional converters.

3. The peripheral device of Claim 2 wherein said microcontroller controls the direction of transmission of said first and said second unidirectional to bi-directional converters via said bus direction signal.

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4. The peripheral device of Claim 1 wherein said optical isolation barrier electronically isolates said peripheral device logic from said serial bus.

5. The peripheral device of Claim 1 wherein said first unidirectional to bi-directional converter and said second unidirectional to bi-directional converter comprise separate ground potentials.

6. The peripheral device of Claim 1 wherein said plurality of bus signals comprises differential data lines.

7. The peripheral device of Claim 1 wherein said serial bus is substantially compliant with the USB (Universal Serial Bus) standard.

8. The peripheral device of Claim 2 where said signal pin comprises a logic high driver and an external pull down resistor.

9. A peripheral device having bus isolation and comprising:

a microcontroller receiving a set of input/output (I/O) signals from peripheral device logic and for translating between said set of I/O signals and a set of bus signals, wherein said set of bus signals are fewer in number than said set of I/O signals;

5 a first unidirectional to bi-directional converter coupled to said microcontroller;

an optical isolation barrier comprising a plurality of optical isolating devices for electrically isolating said bus signals from said serial bus, said optical isolating barrier coupled to said first unidirectional to bi-directional converter via first unidirectional signal lines;

a second unidirectional to bi-directional converter coupled to said optical isolation barrier via second unidirectional signal lines and for generating a set of isolated bus signals; and

a serial bus interface for interfacing with said serial bus using said set of isolated bus signals.

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10. The peripheral device of Claim 9 wherein said microcontroller signals communication direction by a dedicated bus direction signal pin.

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11. The peripheral device of Claim 10 wherein said microcontroller controls the direction of transmission of said first and said second unidirectional to bi-directional converters via said bus direction

signal pin which is coupled to said first and second unidirectional to bi-directional converters.

12. The peripheral device of Claim 9 wherein said optical  
isolation barrier electrically isolates said peripheral device logic from  
said serial bus.

13. The peripheral device of Claim 9 wherein said first  
unidirectional to bi-directional converter and said second unidirectional  
to bi-directional converter comprise separate ground potentials.

14. The peripheral device of Claim 9 wherein said plurality of  
I/O bus signals comprises of differential data lines.

15. The peripheral device of Claim 9 wherein said serial bus is  
substantially compliant with the USB (Universal Serial Bus) standard.

16. A method for isolating a peripheral device from a host  
device comprising the steps of:

a) translating between input output (I/O) signals of peripheral  
device logic of said peripheral device and serial bus signals wherein  
said serial bus signals are fewer in number than said I/O signals;

b) electronically isolating said bus signals to generate isolated bus signals; and

c) interfacing said isolated bus signals over said serial bus to electrically isolate said peripheral device logic from said serial bus.

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17. A method as described in Claim 16 wherein said step b) comprises the steps of:

b1) translating between said serial bus signals and first unidirectional signals;

b2) electrically isolating said first unidirectional signals and second unidirectional signals using optical isolation elements; and

b3) translating between said second unidirectional signals and said isolated bus signals.

18. A method as described in Claim 17 wherein said bus signals and said isolated bus signals comprise bi-directional signals.

19. A method as described in Claim 18 wherein said bus signals further comprise differential data signals.

20. A method as described in Claim 16 wherein said step a) is performed by a microcontroller.

